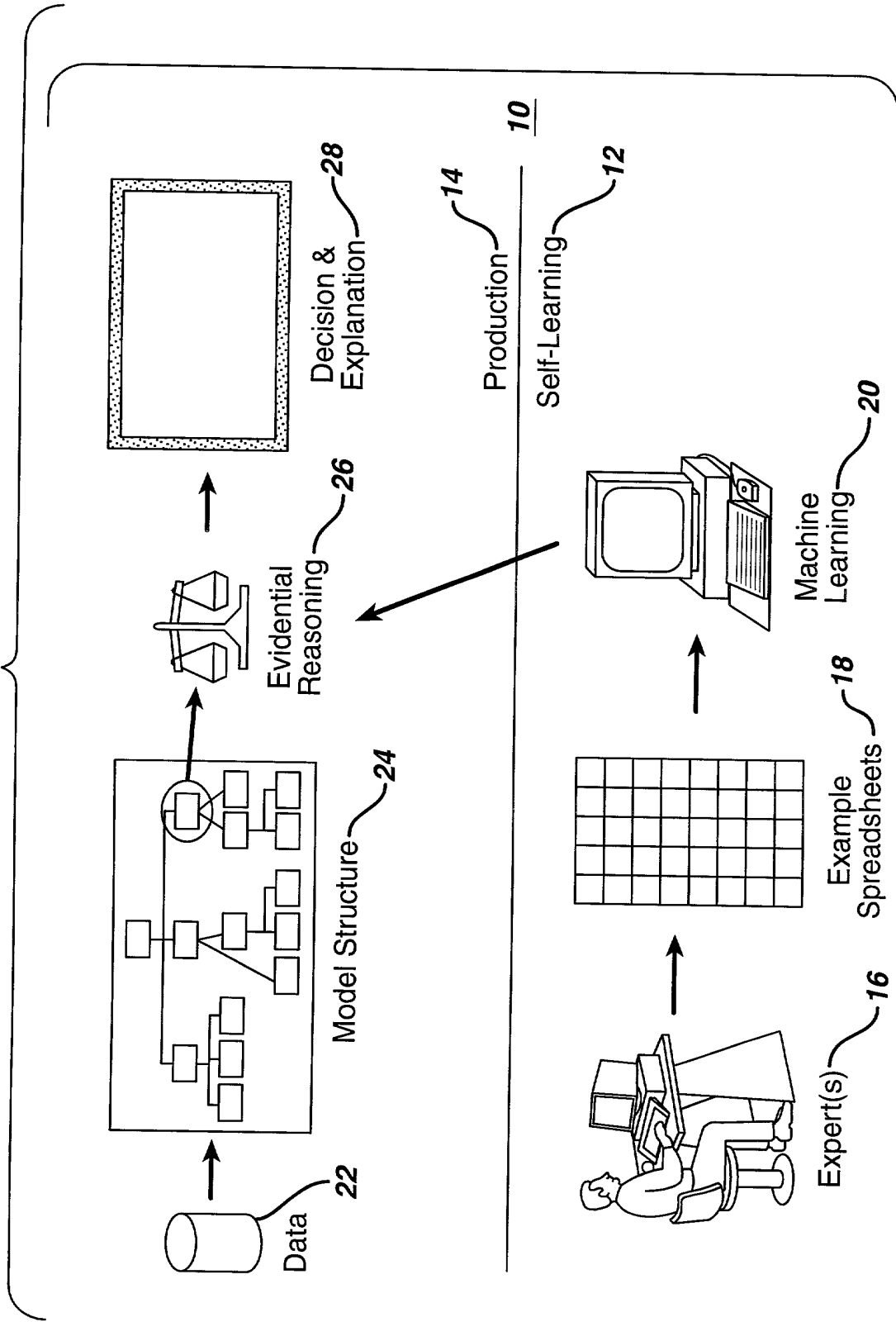


**FIG. 1**



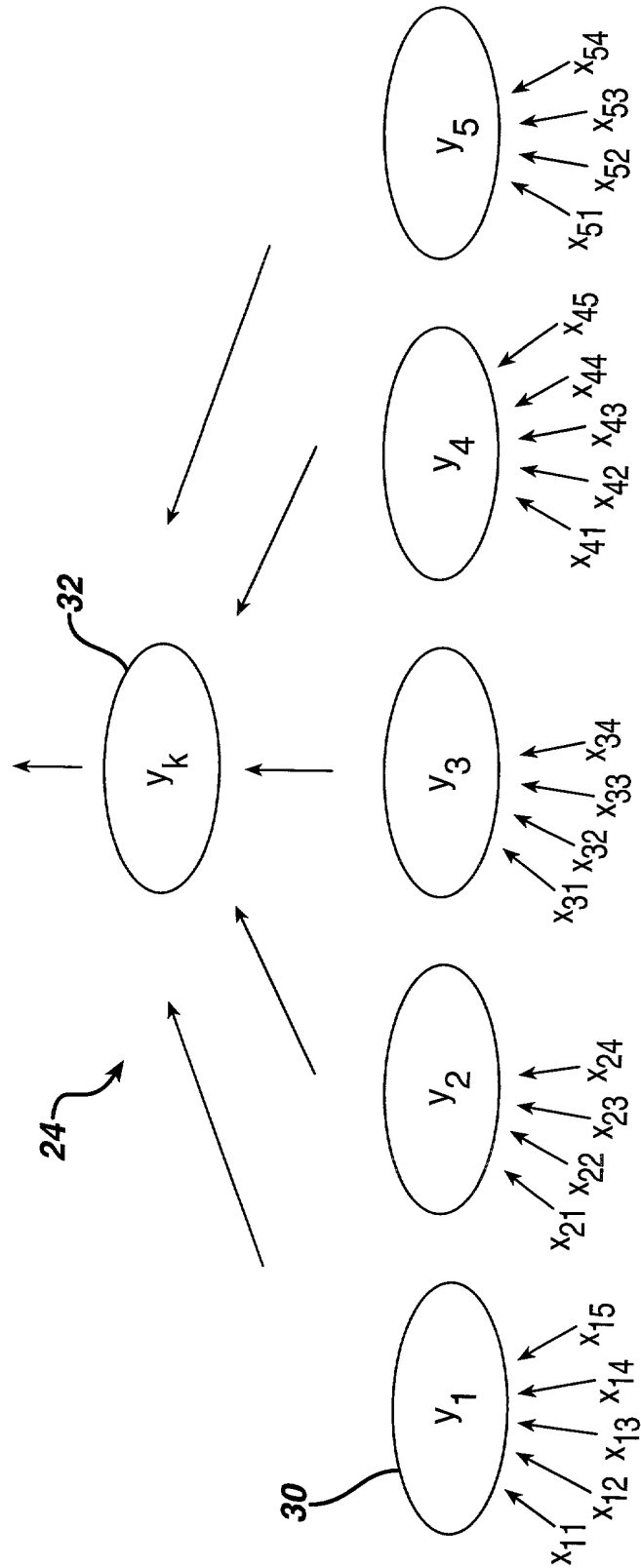
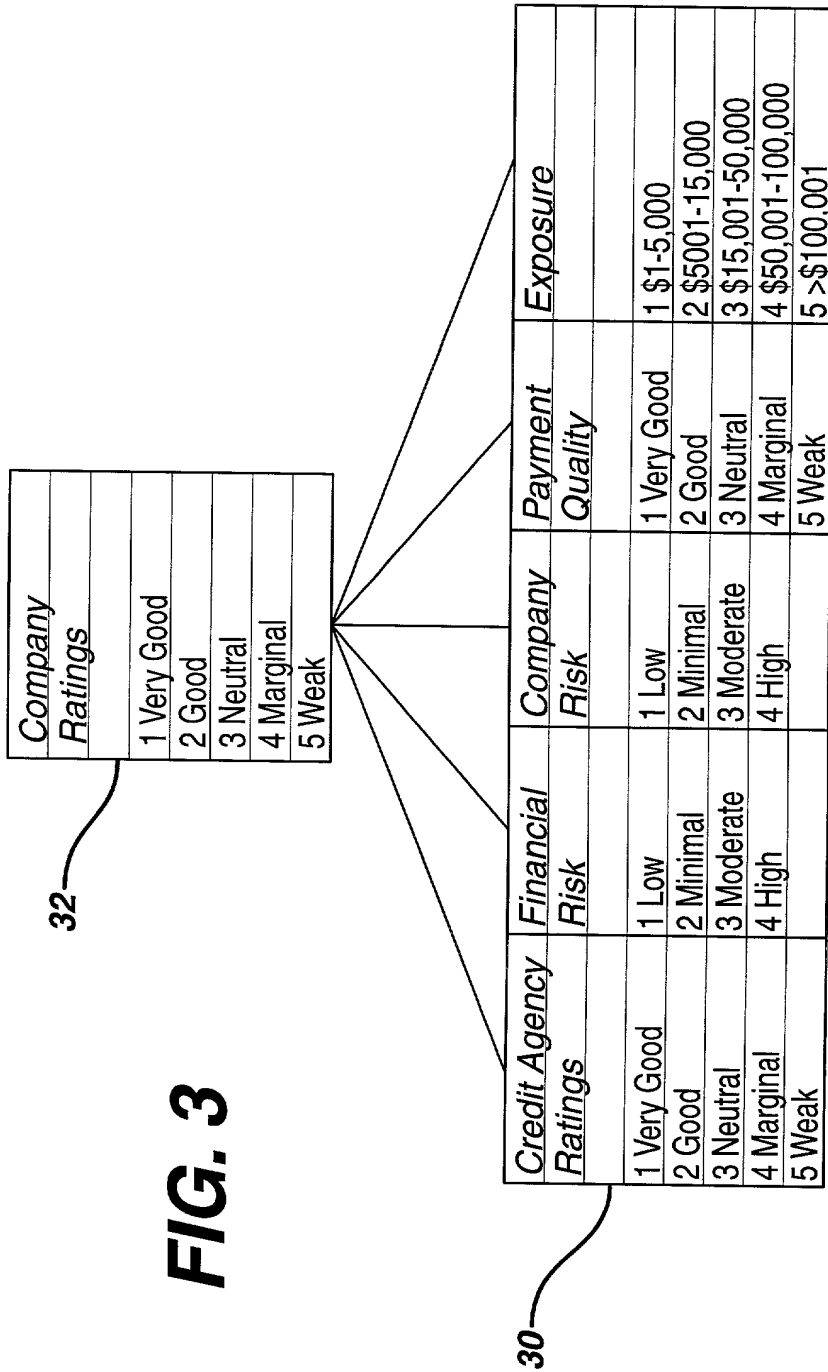
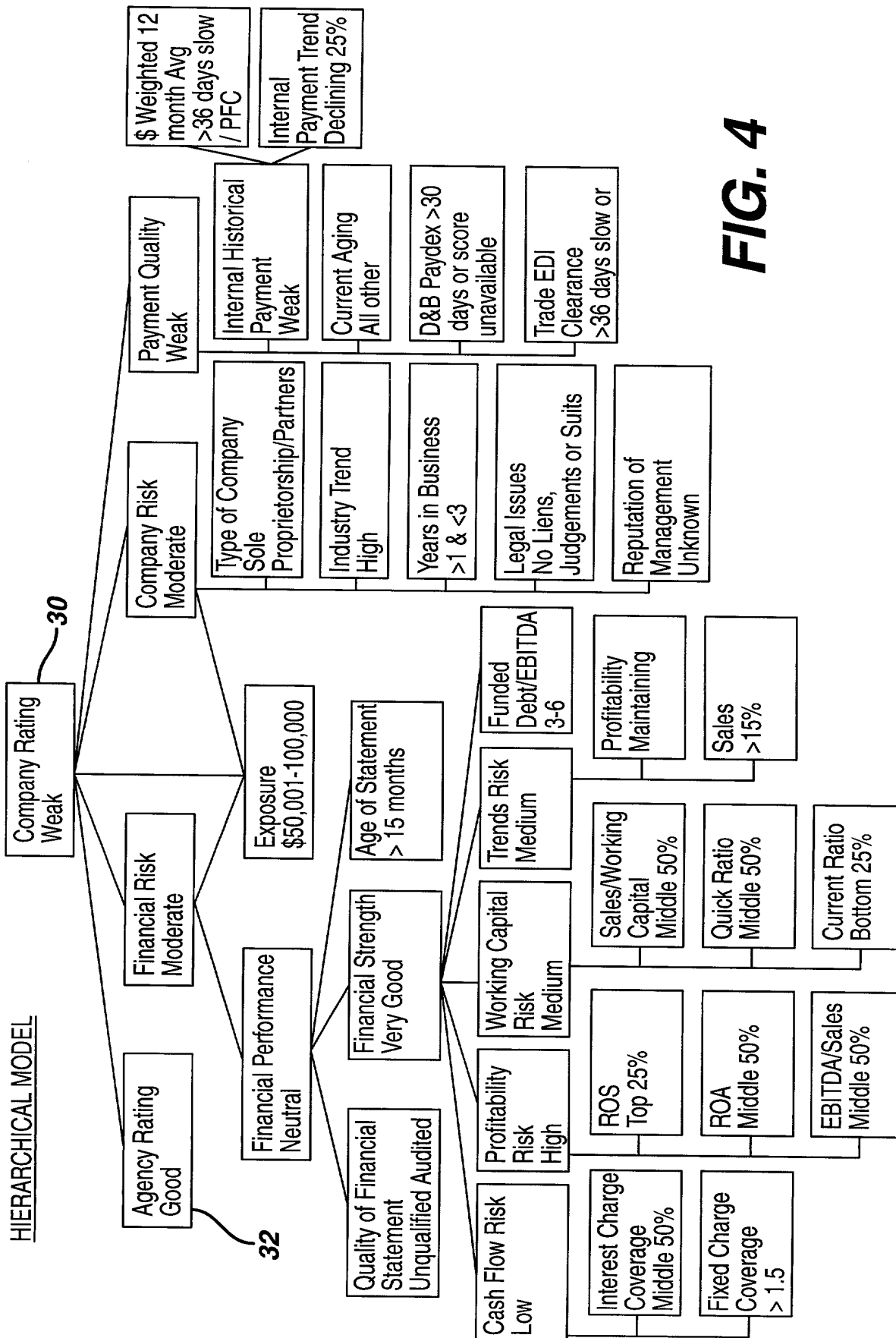
**FIG. 2**

FIG. 3

FIG. 3



**FIG. 4**

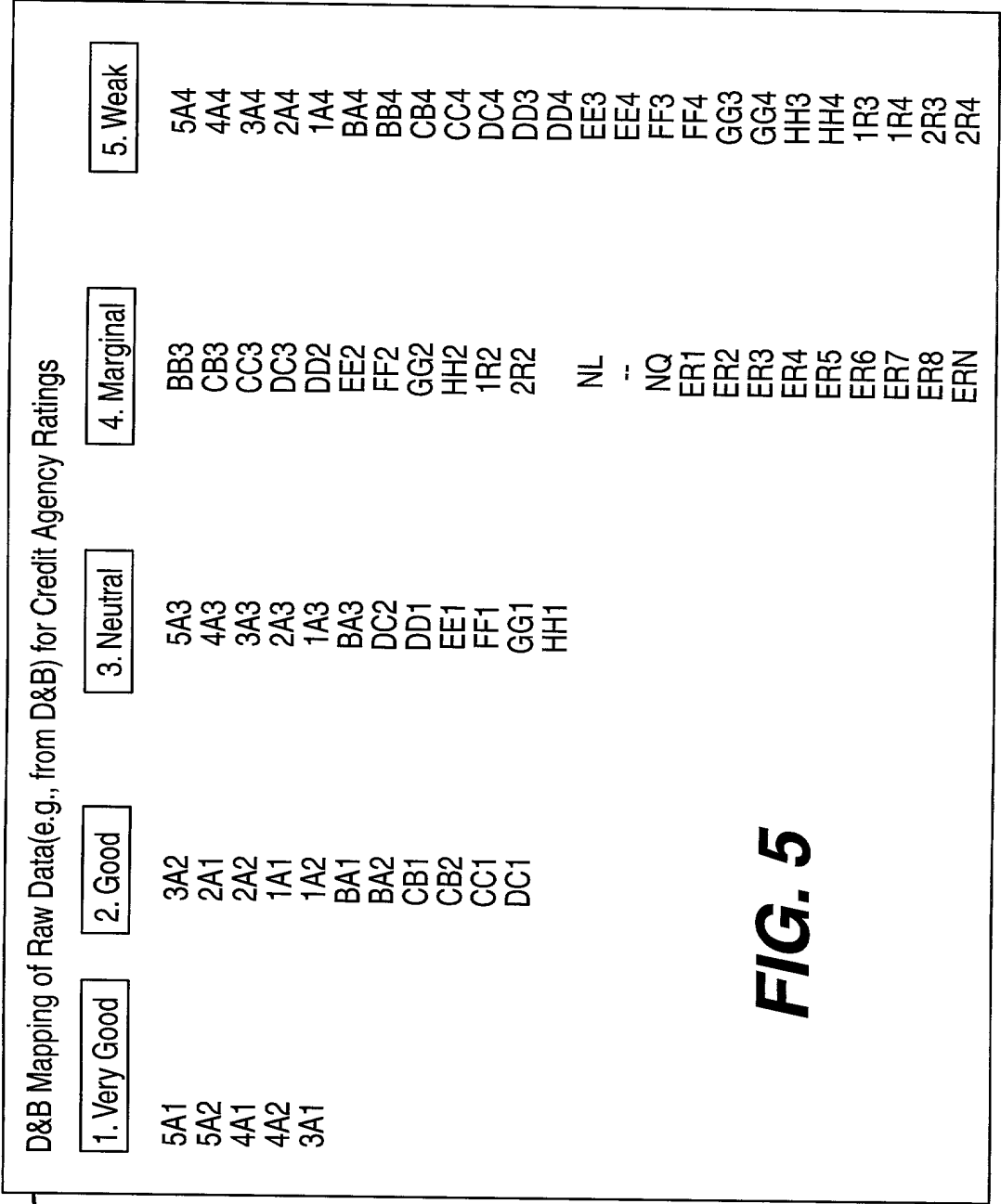
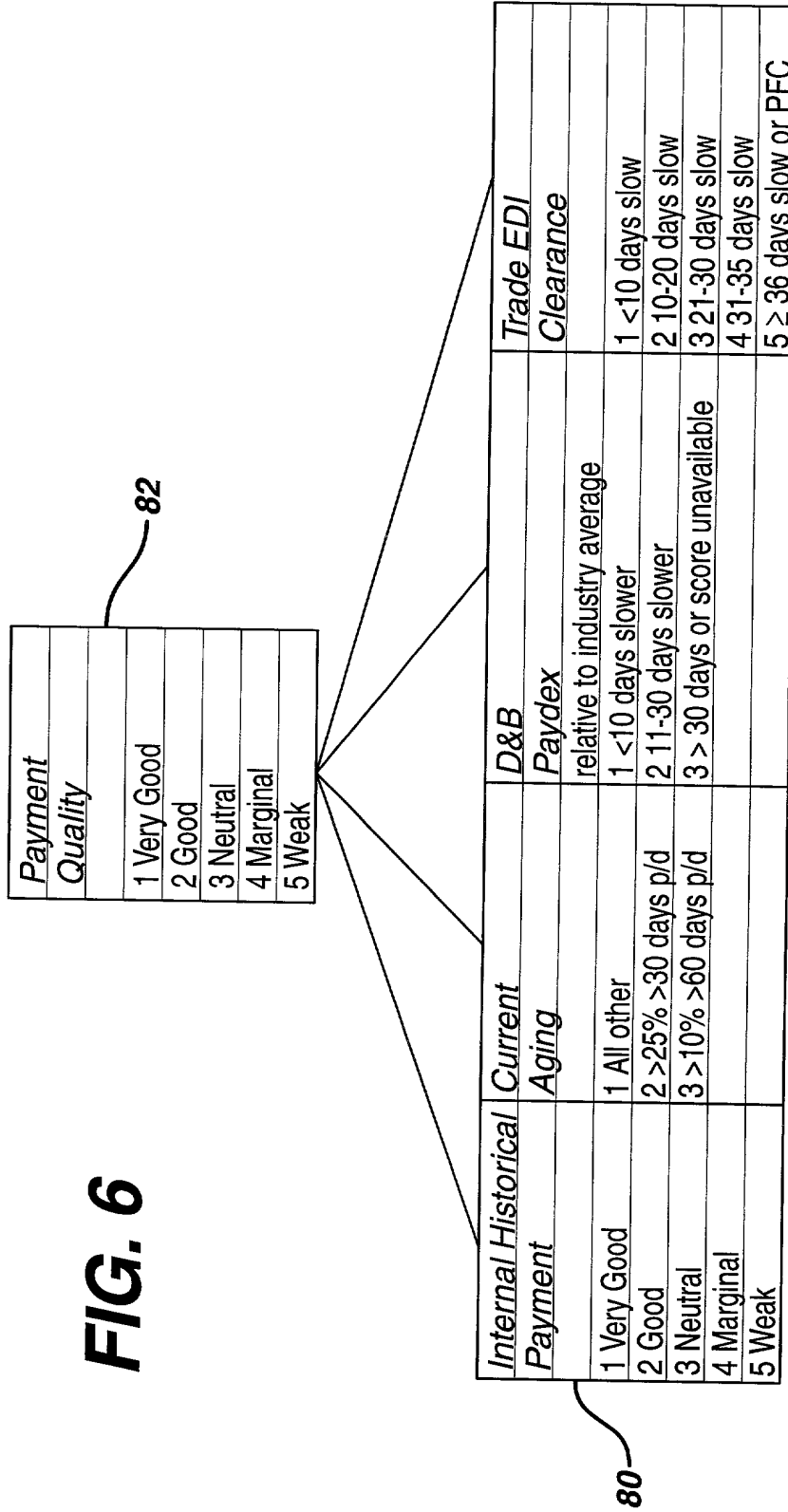
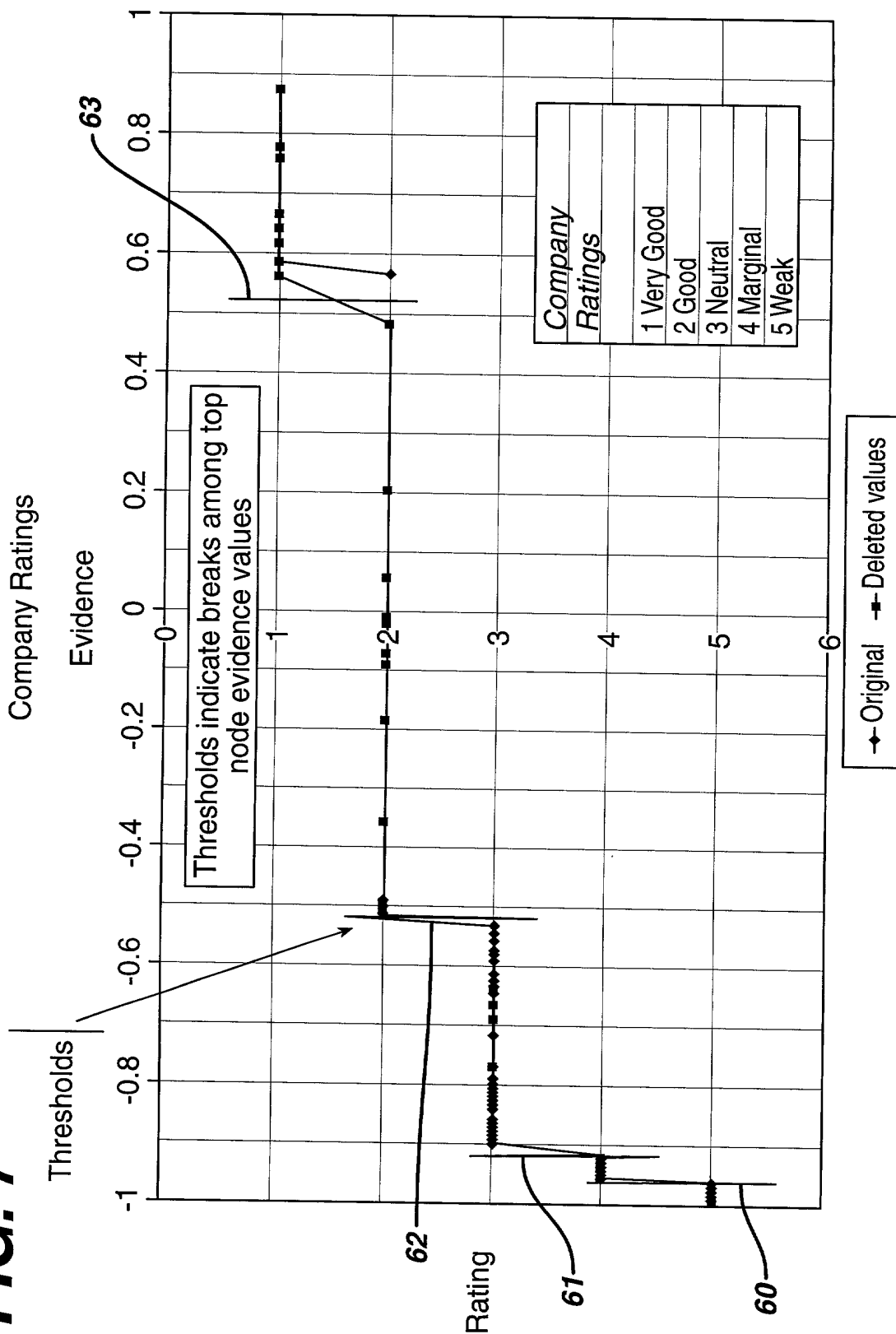


FIG. 5

FIG. 6



**FIG. 7**



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### Company Rating

Agency Rating	Financial Risk	Company Risk	Payment Quality	Exposure	Company Rating
1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5,000	1 Very Good
2 Good	2 Minimal	2 Minimal	2 Good	2 \$5,001-15,000	2 Good
3 Neutral	3 Moderate	3 Moderate	3 Neutral	3 \$15,001-50,000	3 Neutral
4 Marginal	4 High	4 High	4 Marginal	4 \$50,001-100,000	4 Marginal
5 Weak			5 Weak	5 >\$100,001	5 Weak
Case					Comment
604	2	3	1	4	3
1821	5	3	1	5	4
1567	4	4	3	4	5
1713	5	2	1	3	2
260	1	3	3	2	4
1952	5	4	3	1	5
152	1	2	3	1	2
691	2	3	4	4	1
1659	5	1	3	2	4
588	2	2	4	3	3
1093	3	3	4	3	3
132	1	2	2	4	4
760	2	4	3	2	1
25	1	1	1	5	5
1381	4	2	4	2	3
107	1	2	1	2	2
1156	3	4	3	2	1
1880	5	3	4	1	2
595	2	2	4	4	4
591	2	2	4	4	3
142	1	2	2	4	2
1924	5	4	1	5	5
1364	4	2	3	3	3
646	2	3	2	5	5
1704	5	2	1	1	2
1123	3	4	1	5	5
312	1	4	1	3	3
554	2	2	3	1	2
69	1	1	3	4	3
946	3	2	2	5	4

Create a statistical sample of the possible hypothetical cases  
- Expert supplies his opinion or diagnosis

Used as input to machine learning technique

**FIG. 8**



**Evidence Modeling**

Case	Agency Rating	Financial Risk	Company Risk	Payment Quality	Exposure	Company Rating
7	1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5,000	1 Very Good
1601	5 Good	1 Minimal	1 Minimal	2 Good	2 \$5,001-15,000	2 Good
1606	5 Good	1 Minimal	1 Minimal	3 Neutral	3 \$15,001-50,000	3 Neutral
1631	5 Good	1 Minimal	1 Minimal	4 Marginal	4 \$50,001-100,000	4 Marginal
1209	4 Marginal	1 Moderate	2 Moderate	5 Weak	5 >\$100,001	5 Weak
107	1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5,000	1 Very Good
1632	5 Good	1 Minimal	1 Minimal	2 Good	2 \$5,001-15,000	2 Good
132	1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5,000	1 Very Good
507	2 Good	2 Moderate	2 Moderate	2 Good	2 \$5,001-15,000	2 Good
412	2 Good	2 Moderate	2 Moderate	2 Good	2 \$5,001-15,000	2 Good
416	2 Good	2 Moderate	2 Moderate	2 Good	2 \$5,001-15,000	2 Good
55	1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5,000	1 Very Good
606	2 Good	3 High	3 High	2 Good	2 \$5,001-15,000	2 Good

**Evidence Combination Rules**

$$e = e_1 + e_2(1 - e_1)$$

$$e = e_1 + e_2(1 - e_1)$$

$$e = 0$$

$$e = (e_1 + e_2) / [1 - \min(|e_1|, |e_2|)]$$

Evidence values range from 1 (good) to -1 (bad)

**Thresholds**

MIN	1	2	3	4	5
0.5878	-0.5139	-0.8994	-0.9542	-0.9979	
0.8780	0.5678	-0.5339	-0.9194	-0.9685	
0.5781	-0.52391	-0.90942	-0.96137		

**Cumulative evidence for an example defines goodness of top node**

Comments	CE-Comp	Agency	Financial	Company	Payment	Exposure
1	0.878	0.151	0.574	0.025	0.647	0.021
2	0.650	0.151	-0.183	0.025	0.647	0.021
3	0.644	-0.564	0.574	-0.051	0.647	0.021
4	0.622	0.151	-0.183	-0.051	0.647	0.021
5	0.588	0.001	-0.183	0.025	0.647	0.021
6	0.568	0.001	0.574	0.025	-0.059	0.021
7	0.489	0.001	0.574	0.025	-0.478	0.354
8	0.205	0.151	0.574	0.666	0.647	-0.518
9	0.060	0.001	-0.764	0.025	0.647	0.354

**Thresholds indicate breaks among top node evidence values**

MIN	1	2	3	4	5
0.5878	-0.5139	-0.8994	-0.9542	-0.9979	
0.8780	0.5678	-0.5339	-0.9194	-0.9685	
0.5781	-0.52391	-0.90942	-0.96137		

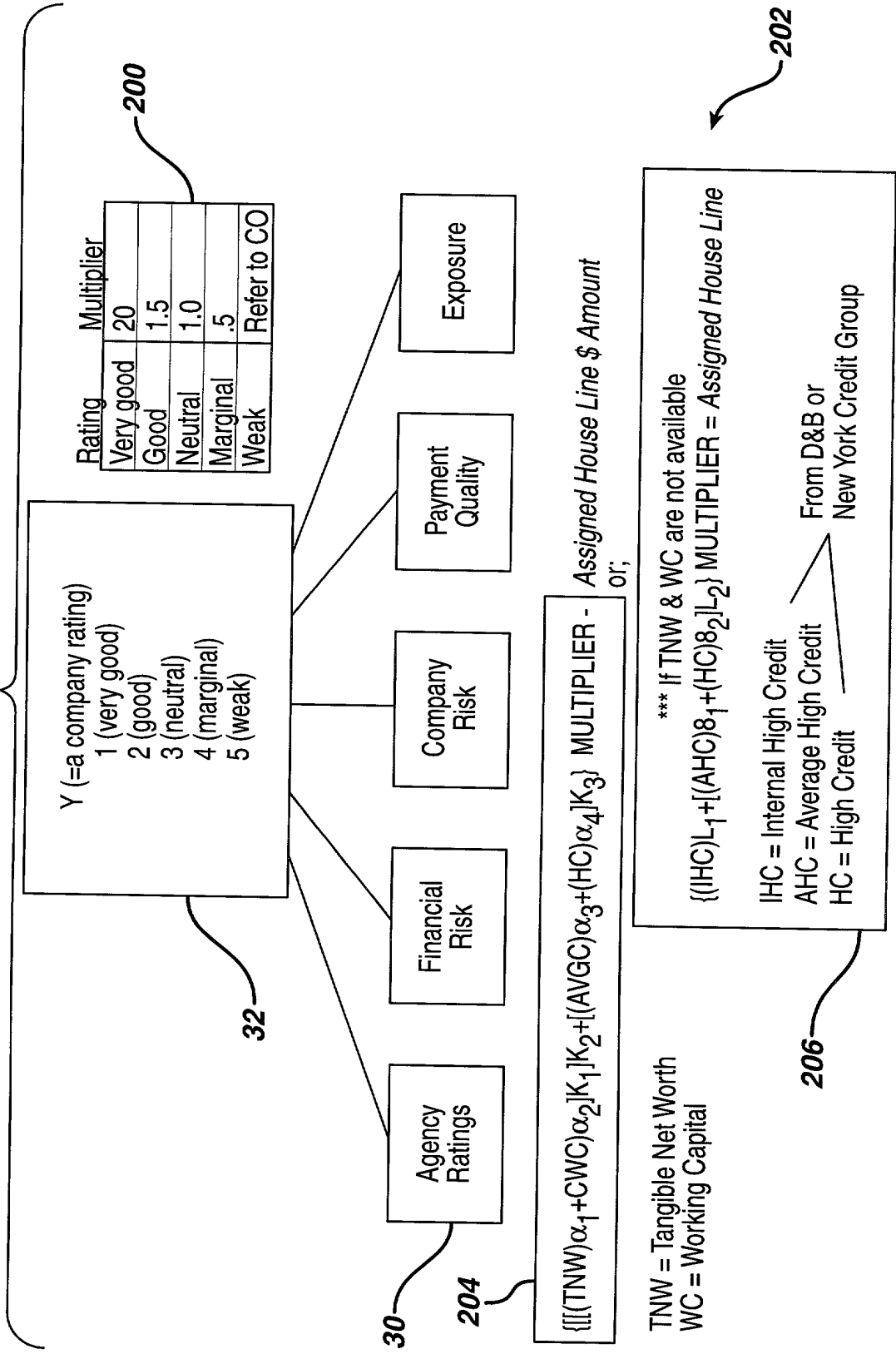
**Evidence matrix associates an evidence value with each risk element value**

**Thresholds indicate breaks among top node evidence values**

MIN	1	2	3	4	5
0.5878	-0.5139	-0.8994	-0.9542	-0.9979	
0.8780	0.5678	-0.5339	-0.9194	-0.9685	
0.5781	-0.52391	-0.90942	-0.96137		

**Evidence values range from 1 (good) to -1 (bad)**

FIG. 10



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200

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202

**FIG. 11**

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Financial Risk		30	32	
Financial Performance	Exposure	Financial Risk	Comments	
1 Very Good	1 \$1-5,000	1 Low	Credit officers thought they	
2 Good	2 \$5001-15,000	2 Minimal	know size of the company (	
3 Neutral	3 \$15,001-50,000	3 Moderate	of net worth) before they co	
4 Marginal	4 \$50,001-100,000	4 High	accurately assess the risk.	
5 Unknown	5 >\$100,001			
6 Weak				

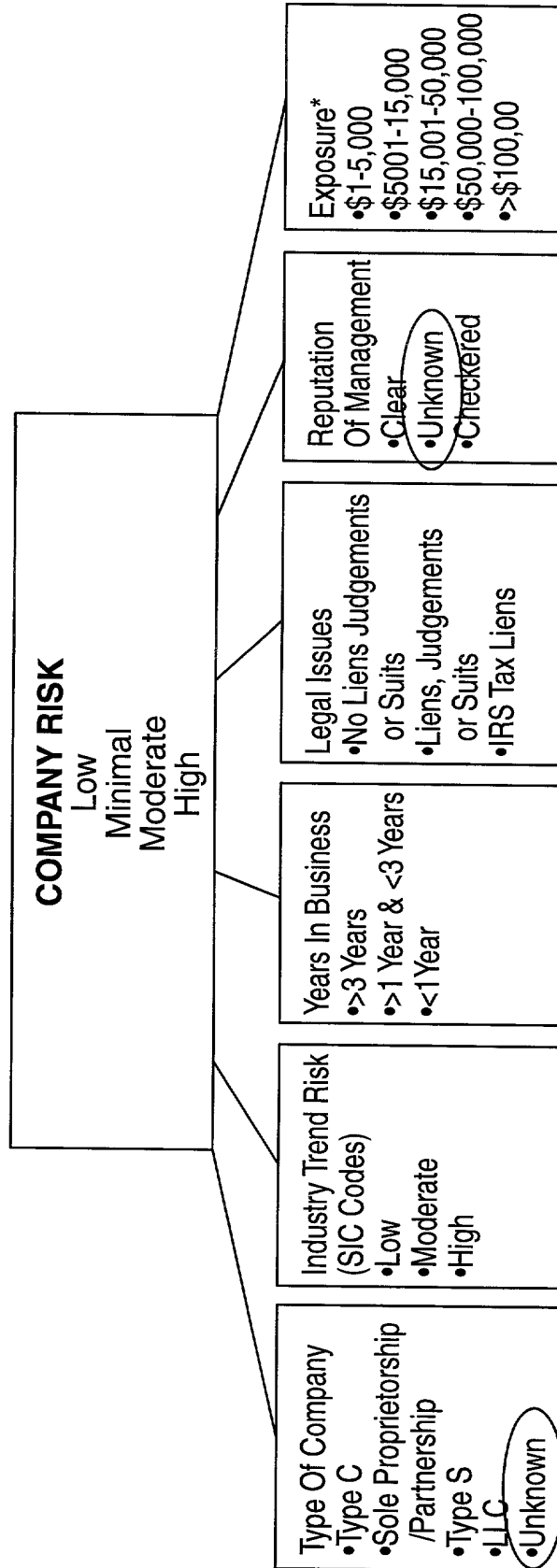
  

Case				
1	1	1	1	
6	2	1	1	
11	3	1	1	
2	1	2	1	
7	2	2	1	
3	1	3	1	
12	3	2	2	
8	2	3	2	
16	4	1	2	
13	3	3	2	
21	6	1	2	
26	5	1	2	
4	1	4	3	
17	4	2	2	
9	2	4	3	
18	4	3	3	Changed from a 2
22	6	2	3	
27	5	2	3	
5	1	5	3	
14	3	4	3	
23	6	3	4	
28	5	3	4	
10	2	5	4	
15	3	5	4	Changed from a 3
19	4	4	4	
24	6	4	4	
29	5	4	4	

The approach identifies values that are outside the logic developed for the majority of cases.

In all cases they were changed one "bin" value to conform. Changes were confirmed by experts.

FIG. 12



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302

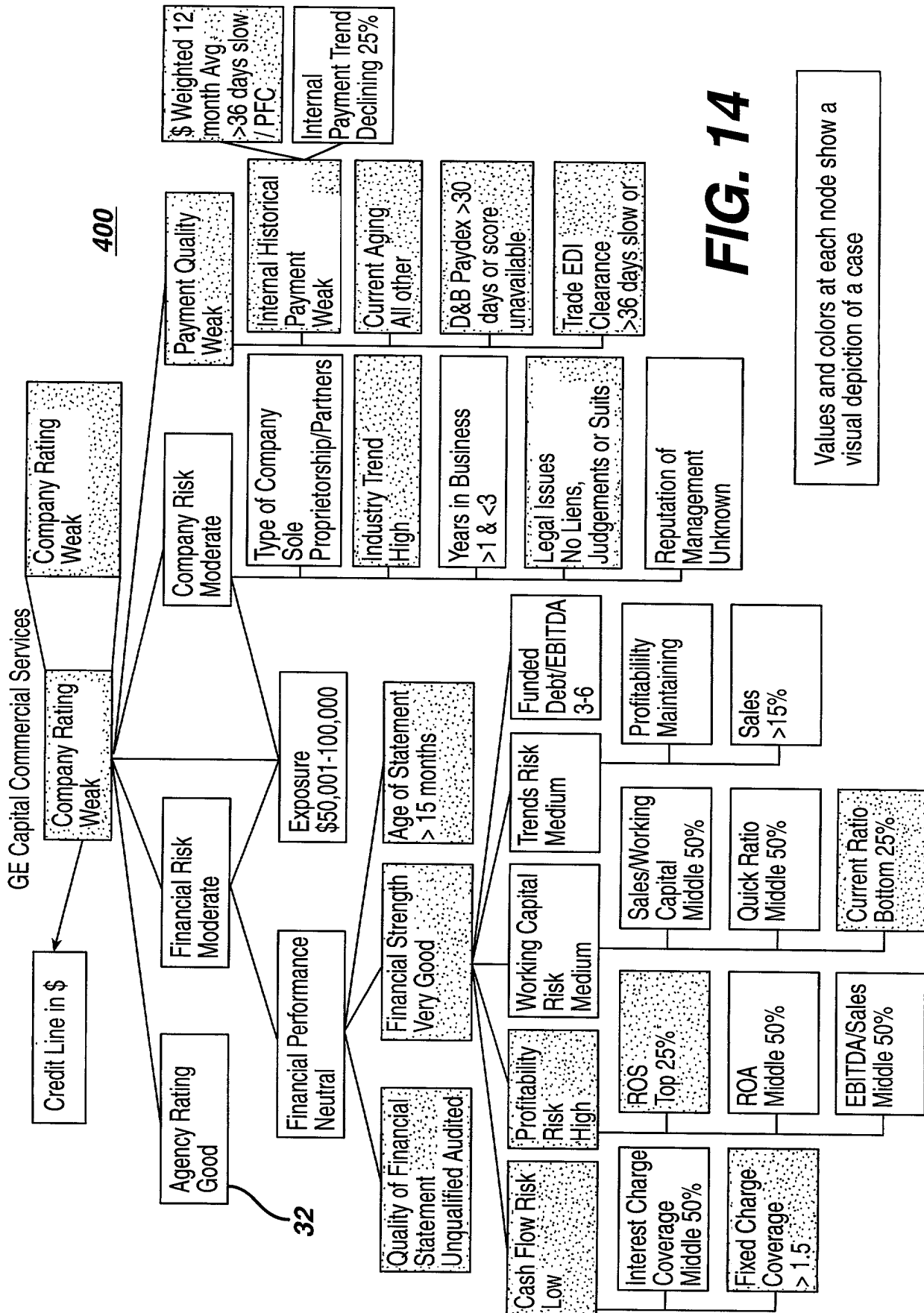


FIG. 15

GE Capital Commercial Service House Line	Test Case 4 \$54,000.00	The Financial performance of: Was based on:	Neutral
The Overall Company Rating of:	Marginal	A Quality of Financial Statement of:	Unqualified Audited
Was based on:		A Financial Strength of:	Very Good
An Agency Rating of:	Marginal	An Age of Statement of:	15 months
A Financial Risk of:	High		
An Exposure of:	> \$100,0001	The Financial Strength of:	Very Good
A Company Risk of:	Moderate	Was based on:	
A Payment Quality of:	Good	A Cash Flow Risk of:	Low
		A Profitability Risk of:	High
The Financial Risk of:	High	A Working Capital Risk of:	Medium
Was based on:		A Trends Risk of:	Medium
A Financial Performance of:	Marginal	A Funded Debt/EBITA of:	3-6
An Exposure of :	> \$100,0001		
		The Cash Flow Risk of:	Low
The Company Risk of:	Moderate	Was based on:	
Was based on:		An Interest Charge Coverage of:	Middle 50%
A Type of Company of:	Type C	A Fixed Charge Coverage of:	> 1.5
An Industry Trend of:	Low		
Years in Business of:	>3	The Profitability Risk of:	High
Legal Issues of:	No Liens, Judgements or Suits	Was based on:	
A reputation of management of:	Checkered	A ROS of:	Top 25%
		A ROA of:	Middle 50%
The Payment Quality of:	Good	An EBITA/Sales Ratio of:	Middle 50%
Was based on:			
An Internal historical payment of:	Good	The Working Capital Risk of:	Medium
A Current Aging of:	All other	Was base on:	
A D&B Paydex of:	11-30 days slower (or Unknown)	A Sales/Working Capital Ratio of:	Middle 50%
A Trade EDI of:	10-20 days slow	A Quick ration of:	Middle 50%
		A Current ration of:	Bottom 25%
The Internal Historical Payment of:	Good	The Trends Risk of:	Medium
Was based on:		Was based on:	
A Weighted Monthly Average of:	11-20 days slow	A Profitability of:	Maintaining
A Payment Trend of:	24% to -24% (or Unknown)	A Sales of:	> 15%